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TAB A

Department of Energy
Washington, D.C. 20545

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INFORMATION MEMORANDUM

TO: Deputy Secretary
Under Secretary

Original Signed By
James L. Liverman

FROM: Acting Assistant Secretary for Environment

SUBJECT: PALOMARES (PROJECT INDALO), SPAIN

Purpose

To provide the Deputy Secretary and the Under Secretary with information regarding the status of DOE commitments to the Government of Spain and findings and concerns relative to the subject.

Background

1) On January 17, 1966, a U.S. Air Force B-52 bomber and a U.S.A.F. jet fuel tanker aircraft collided during refueling operations over the southeastern coast of Spain. Four nuclear weapons carried by the B-52 fell to the earth, of which two were recovered intact and two burned after the high explosive component detonated upon impact. The latter two weapons fell on either side of the village of Palomares: one near the east edge of the village, and one onto a rocky area west of the village (areas 2 and 3 on the attached map - Tab A).

2) The burning of the weapons resulted in substantial plutonium contamination of the surrounding areas. Extensive efforts were organized immediately to define the areas and levels of contamination, to remove fragments of the weapons and planes, and to decontaminate the area to the extent considered necessary. U.S. Air Force troops were used to accomplish the cleanup.

3) Ultimately the most heavily contaminated areas (around the impact sites and downwind from the sites) were decontaminated by removing the top few centimeters of soil, which was placed in steel drums and transported to the United States for burial at Savannah River.

Much of the remaining contaminated land under cultivation was deep plowed to dilute the plutonium and to reduce its concentration to negotiated levels which were considered to be acceptable to Spain and to the U.S. The lands not under cultivation, due mostly to their rocky character and/or poor accessibility, were raked and watered in an attempt to fix the plutonium to the soil and prevent its resuspension.

4) The initial interaction between the United States and Spain resulted in the Otero-Hall agreement (copy attached, see Tab B) between the two countries. It was signed in Madrid in March 1966 by the Atomic Energy Commission on behalf of the U.S., and by the Junta de Energia Nuclear on behalf of Spain, and called for a four-point follow-up program and associated U.S. and Spanish responsibilities. This program became known as Project Indalo. Basically, the agreement was designed to obtain information in four areas:

   a) Uptake and excretion of plutonium and uranium by a population group;

   b) Resuspension of plutonium from contaminated soil;

   c) Internal and external contamination of agricultural products;

   d) Temporal migration and redistribution of plutonium oxide in soil.

5) The Spanish research and follow-up program has proceeded at a relatively low level since 1966. It has been supported by a small commitment of U.S. funds (see Tab C) which amounts currently to 10-15 percent of the total program cost. There has been a fairly large commitment of equipment from the U.S., however.

6) As a result of the measuring, monitoring, and sampling activities, it is apparent that area 3 was decontaminated quite well. Little plutonium has been detected in air, water, or plants from this area since 1966.

7) Area 2 was not decontaminated to the same extent, due in part to its rocky character and difficulty of accessibility and in part because it was not extensively used as cropland. Environmental monitoring revealed no movement of plutonium in this area until the early '70's. Within the past two years the local farmers, pressed for arable land to raise their principal cash crop of tomatoes, began to farm the less desirable farm land near the area 2 impact point. This has

resulted in considerable resuspension of plutonium, contaminating not only the tomatoes grown in area 2, but also grain crops (barley and corn) grown as much as one-half mile downwind.

8) Since 1972 Dr. Chester R. Richmond, Associate Director of the Oak Ridge National Laboratory, and Mr. Phillip N. Dean, Lawrence Livermore Laboratory, have served as consultants to the Spanish Government. Mr. Dean, who serves as an advisor on electronic and equipment facilities, visits Spain approximately yearly, and Dr. Richmond, who serves as a scientific advisor, exchanges visits with his Spanish counterpart about every 1½-2 years.

Discussion

We and our scientific advisors believe that it is time for a major re-evaluation of "Project Indalo" and of the U.S. contribution and role in it. This is based upon several factors:

1) Backlog: There is a large backlog of environmental samples resulting in delays of a year or more between the time a sample is taken and the time it is analyzed for plutonium. This backlog must be eliminated so that real time analyses can be made; this will permit detection of the movement of plutonium and of potential problems as they arise rather than up to a year later. Reduction of this backlog can be accomplished only through additional equipment provided by the United States.

2) Environmental Monitoring: Because of the increased agricultural activity in area 2, increased monitoring of air, soil and vegetation samples is necessary to ascertain movement of the plutonium and to obtain more accurate surface concentration measurements of plutonium in this area. Some time ago two of the four air monitoring stations, one of which was strategically located with respect to the newly cultivated areas, ceased to function. These should be replaced. In addition, examination of native and domestic fauna, as well as flora, may be useful.

3) Decontamination: Depending upon the findings resulting from increased monitoring of area 2, it may be necessary to consider additional decontamination alternatives.

4) Personnel Monitoring: A more intensive and controlled monitoring program is needed. This involves transport of the individuals to Madrid for several days for chest counting (for radioactivity in the lung), for medical examination, and for excreta collection.

Because of social and community sensitivities, this activity has not been as organized or as controlled as it could be. Virtually all of these problems recently have been resolved, but no unequivocal data exist as to the level of contamination, if any, within the residents of Palomares.

5) Public Interest

a) United States: There has been a heightened interest in and awareness of potential consequences of land contamination by plutonium and of exposure to plutonium. This is reflected in activities such as those of the Hanford Environmental Health Foundation, which manages the Transuranium Registry, the Los Alamos Study of plutonium workers, the litigation against the U.S. Government over soil contamination around Rocky Flats, the EPA Proposed Guidance on Dose Limits for Persons Exposed to Transuranium Elements in the General Environment, the cleanup of the Enewetak Atoll and resettlement of the Enewetak peoples, and various issues raised concerning plutonium toxicity and low level radiation exposure in general (e.g., the Mancuso, "Smoky", and naval shipyard issues). All of these support the need for increased surveillance of both the environment and the peoples in areas contaminated by plutonium from U.S. weapons.

b) Spain: In 1966 Palomares was an isolated rural village inhabited primarily by a farming population growing a single cash crop--tomatoes. A severe drought in the years following 1966 (which some Spanish speculate was caused by a lowering of the water table resulting from the use of great quantities of water by U.S. troops in wetting the ground to reduce resuspension of plutonium after the accident) caused a number of the villagers to work in other European countries for limited periods of time. This resulted in an increased awareness on the part of the villagers.

The change of the Spanish Government and society following the end of the government of Generalissimo Franco also has contributed to a changing climate in Spain: Communications are better, society is more open, investigative reporting is now possible, issues are freely discussed in the legislature, and questions are raised in medical meetings and symposia. While this appears to be beneficial to the people of Spain, it also increases the likelihood that "Project Indalo" will at some time be closely examined. In addition, the villagers of Palomares are beginning to be aware of their rights of legal redress and, in one case, have already

won a judgment in the Spanish Supreme Court. Although this suit was not related to plutonium, it was related to property damaged by the U.S. military at the time of the cleanup, and the precedent of legal restitution for damaged property has been established.

Summary

In view of the lack of definitive data on the residents of Palomares, and because of the redistribution of plutonium in area 2, it is incumbent upon the U.S. to increase its efforts to support the objectives of the Otero-Hall agreement.

Therefore, from several U.S. and Spanish perspectives, the U.S. must reassess its commitment to and the direction of this activity. Consequently, I have directed Dr. Richmond, Mr. Dean and Dr. Bruce Wachholz (of my staff) to provide within the next few months a detailed scope and protocol of the entire effort and to identify what financial, personnel and equipment resources might be required. After our position is agreed upon, we will discuss it with the appropriate Spanish authorities. There seems to be little doubt that this activity will require an increased commitment from the United States and from the Department of Energy.

Finally, it must be stated that most of the funding and almost all of the work has been carried out by the Spanish. They are competent and astute in all matters, and their relationships with us and with the villagers have been excellent. Their continued understanding and cooperation are critical to the success of the program.

Attachments:
Tab A - Map of Palomares
Tab B - Otero-Hall Agreement
Tab C - U.S. Funding for Project Indalo

cc: Ms. Thomas, IA
Mr. Robertson, IA
Mr. Greenleigh, GC
Mr. Zanetell, CR
Mr. Cannon, IR
Maj. Gen. Bratton, DP
Mr. Thorne, ET
Mr. Leith, EV

Prepared by: EV/OTI: BWachholz/lh: 353-4365: 3/23/78

TAB A

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Plutonium isopleths — Palomares, Spain.